Scalable asymptomatic crop disease detection with airborne imaging spectroscopy and cloud computing

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Scalable early detection of grapevine viral infection with airborne imaging spectroscopy

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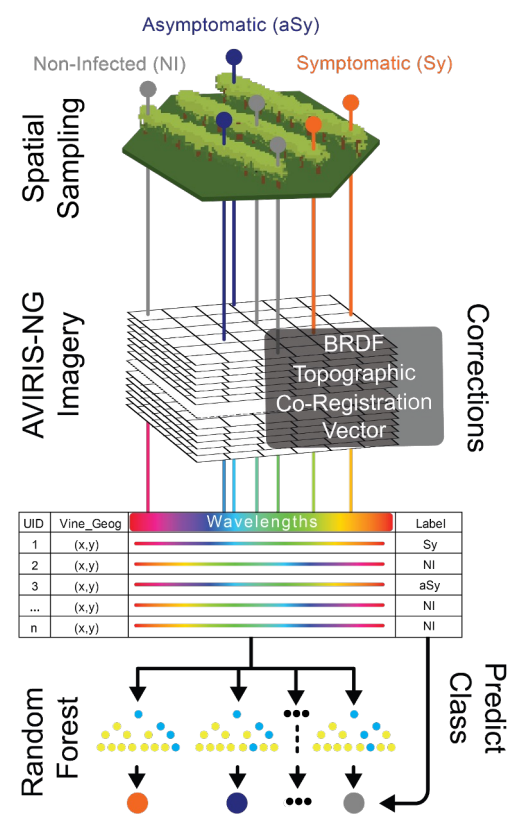
- Developed a workflow to detect symptomatic and asymptomatic grapevine leafroll virus
- Early detection of asymptomatic infection allows for mitigation to minimize spread and cost of disease for grape growers

Towards Cloud-Native, Machine Learning Based Detection of Crop Disease with Imaging Spectroscopy
Accepted JGR Biogeosciences

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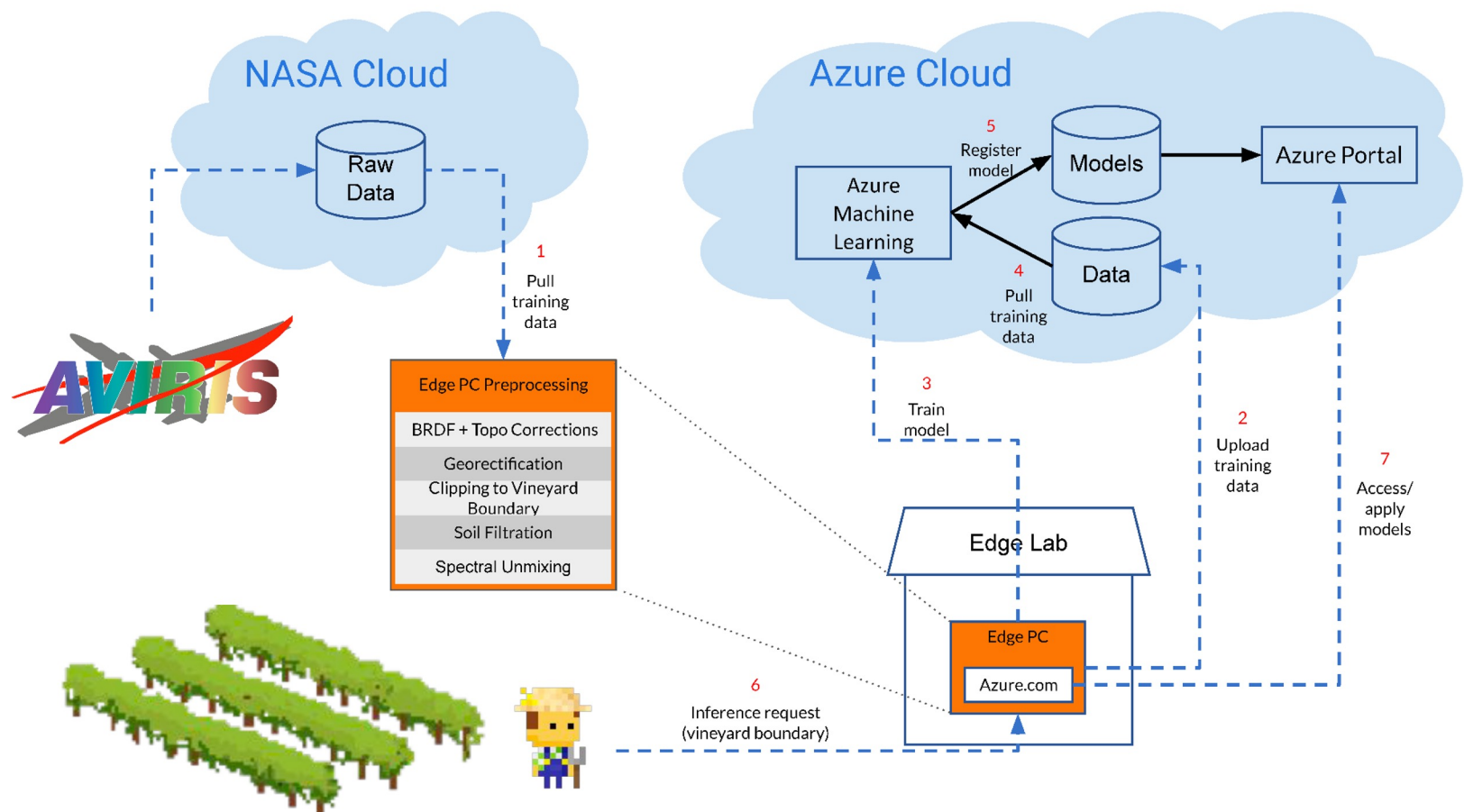
- Prototyped a cloud-based infrastructure for deploying plant disease detection models on spectral imagery and a portal for end-user stakeholder (growers) to access the results
- In-person outreach to grape growers in Lodi, Santa Ynez valley, and Sonoma valley in late April and early May

SHIFT: Brander Field Campaign
Data analysis phase

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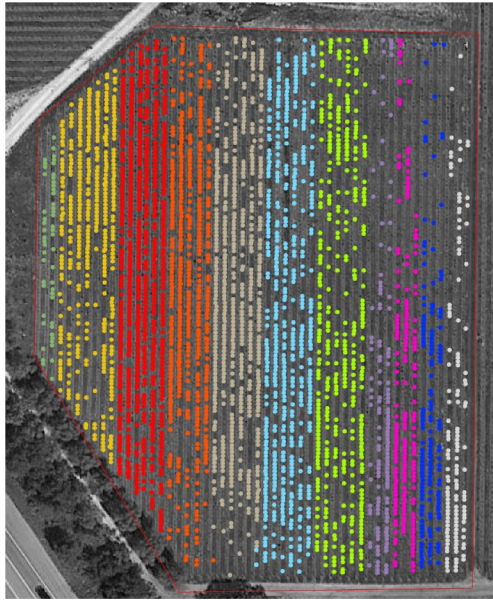
- >5000 vines surveyed by hand and robotically during the SBG SHIFT airborne campaign
- Training a deep learning model with combination of airborne and ground robot imagery

Sharpened ET, thermal, and other data modalities from Planet Fusion data product
Data analysis phase

Planet's sharpened (3m) fusion (VIIRS, Landsat, MODIS) data product offers near daily acquisitions for thermal and 8-band reflectance data over all vineyards where we have recorded ground incidence of GLRaV-3. This dataset will allow the research team to investigate how thermal data-products and its derivatives improve GLRaV-3 detection models.
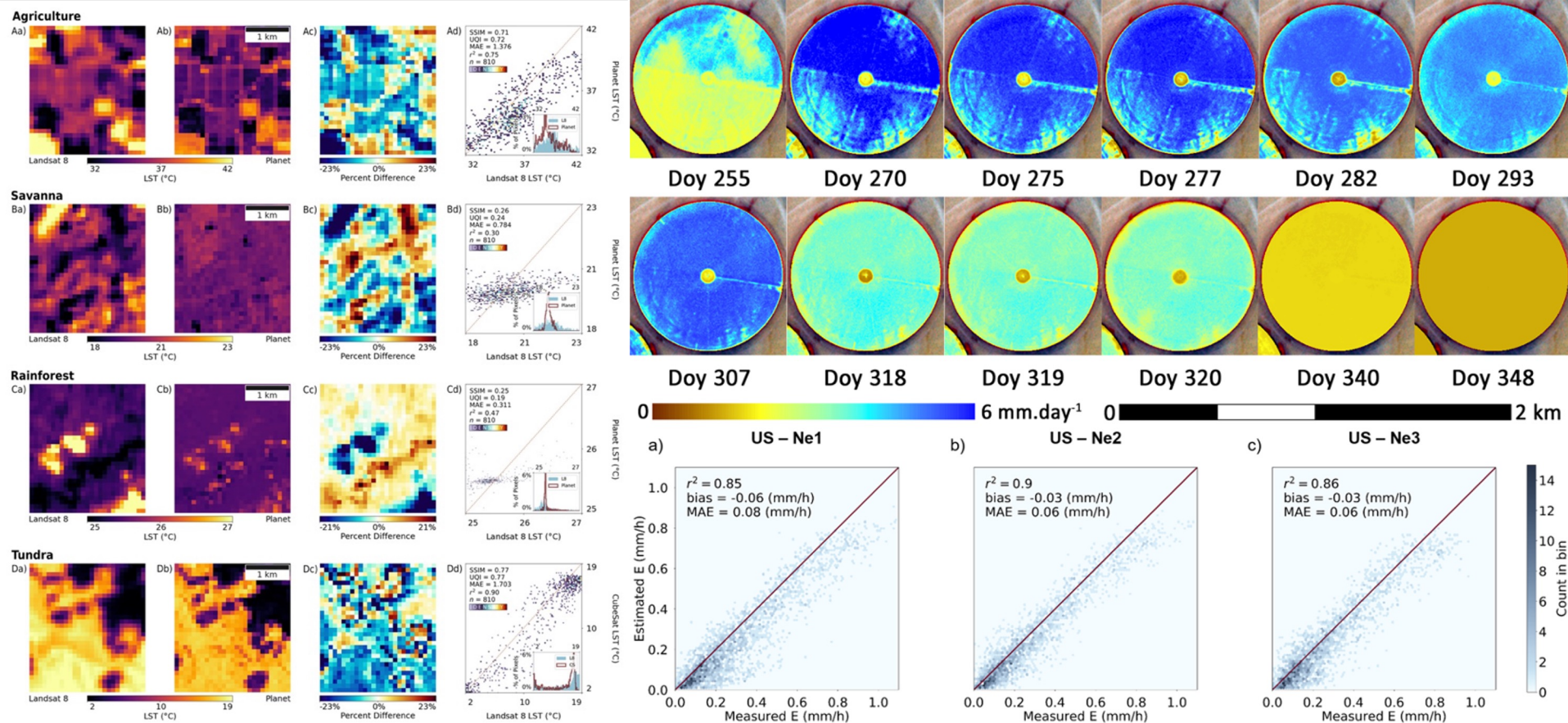
K-Sharpened land surface temperature rasters over validation site (Aragon, *in prep.*)

K-Sharpened ET measurements over validation sites, figures provided by Bruno Aragon (Aragon *et al.* 2018, 2021)

- Working on a manuscript with Bruno Aragon (Planet) and Josh Fisher (Chapman University/HydroSat) to use daily pan-sharpened evapotranspiration products as another predictor of disease presence